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Seventh Semester B.E. Degree Examination, June/July 2014

Image Processing

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. With the help of a block diagram, explain the fundamental steps in digital image processing. (07 Marks)
- b. With a block diagram, explain the components of a general purpose image processing system. (07 Marks)
- c. Explain any two applications of digital image processing. (06 Marks)
- 2 a. Explain image acquisition using sensor strips and sensor arrays. (08 Marks)
- b. What do you mean by image sampling and quantization? (06 Marks)
- c. With examples explain the following distance measures:
 - i) Euclidean
 - ii) City-block
 - iii) Chess-board
 (06 Marks)
- 3 a. Explain separability of unitary transforms and basis images. (06 Marks)
- b. List few properties of unitary transforms. (06 Marks)
- c. Given the orthogonal matrix 'A' and image 'u' find the transformed image and the basis images $A = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$, $u = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$. (08 Marks)
- 4 a. Write the expressions used to construct Haar transform of order N. Using these construct Haar transform for N = 2. (10 Marks)
- b. Explain how an N × N Slant transform matrix is obtained by recursion. (10 Marks)

PART – B

- 5 a. Explain: i) Contrast stretching, ii) Gray level slicing, iii) Bit-plane slicing. (06 Marks)
- b. What is an histogram? How does histogram of the following image look like:
 - i) Dark image
 - ii) Bright image
 - iii) Low contrast image
 - iv) High contrast image
 (08 Marks)
- c. Explain high boost filtering. (06 Marks)
- 6 a. Explain homomorphic filtering approach for image enhancement. (10 Marks)
- b. Explain five important noise probability density functions. (10 Marks)
- 7 a. Explain the following order statistic filters:
 - i) Median filter
 - ii) Max and min filters
 (08 Marks)
- b. Explain minimum mean square error filter. (12 Marks)
- 8 a. What is HSI color model? Give the expressions for converting RGB to HSI and also for HSI to RGB. (10 Marks)
- b. Write a note on full color image processing. (10 Marks)

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